WHAT IS CLAIMED IS:

1. A switched-capacitor converter comprising:

a supply voltage input for receiving a supply voltage;

an output circuit comprising a load resistance and a load capacitance connected in parallel;

a diode circuit comprising a first diode and a second diode connected in series at a diode junction point, said diode circuit being connected in parallel with said output circuit;

first and second semiconductor switches connected in series at a switch junction point; said semiconductor switches being connected between said supply voltage input and said output circuit; and

a flying capacitance connected between said switch junction point and said diode junction point;

wherein said load capacitance is charged via said flying capacitance and said second diode when said first switch is ON and said second switch is OFF, and

said load capacitance is discharged via said first diode and said flying capacitance when said first switch is OFF and said second switch is ON.

2. The converter of claim 1, wherein each said semiconductor switch includes a p-channel MOSFET.

3. The converter of claim 1, wherein each said semiconductor switch includes an n-channel MOSFET.

4. The converter of claim 1, further comprising a current limiting component in series with at least one of said first diode, said flying capacitor, said second switch and said output circuit.

5. The converter of claim 4, wherein said current limiting component is an inductance.

6. The converter of claim 4, wherein said current limiting component is disposed between said first diode and said diode junction point.

7. The converter of claim 6, wherein said current limiting component is an inductance.

8. The converter of claim 1, further comprising a control IC for controlling said first and second semiconductor switches, said control IC comprising:

a high side well powered by said input supply voltage and including a first driver circuit connected for driving said first semiconductor switch;

a floating well powered by said flying capacitor and including a second driver circuit connected for driving said second semiconductor switch; and

a control circuit powered by an output voltage across said output circuit.

9. The converter of claim 8, wherein, at a start-up time, said control circuit charges said load capacitance to a predetermined initial voltage.

10. The converter of claim 9, wherein said control circuit controls said first semiconductor switch to charge said flying capacitance and thereby charge said load capacitance to said predetermined initial voltage.

11. The converter of claim 8, wherein said control circuit delivers a variable amount of charge to said load capacitance per unit time.

12. The converter of claim 11, wherein said control circuit increases a discharge frequency in response to an increase in load power demand, and maintains a predetermined fixed discharge time.

13. The converter of claim 12, wherein, when said discharge frequency reaches a predetermined maximum, the control circuit maintains said maximum frequency and increases the discharge time in response to an increase in load power demand.

14. The converter of claim 11, wherein, when said discharge frequency reaches a predetermined maximum, the control circuit maintains said maximum frequency and increases

the discharge time in response to an increase in load power demand.

15. A switched-capacitor converter comprising:

a supply voltage input for receiving a supply voltage;

an output circuit comprising a load resistance and a load capacitance connected in parallel;

a diode circuit comprising a first diode and a second diode connected in series at a diode junction point, said diode circuit being connected in parallel with said output circuit;

first and second semiconductor switches connected in series at a switch junction point; said semiconductor switches being connected between said supply voltage input and said output circuit; and

a flying capacitance connected across said second semiconductor switch and to said diode junction point;

wherein said load capacitance is charged via said flying capacitance and said second diode when said first switch is ON and said second switch is OFF, and

said load capacitance is discharged via said first diode and said flying capacitance when said first switch is OFF and said second switch is ON.

16. The converter of claim 15, wherein said first and second semiconductor switches are interconnected by a third diode, said flying capacitor being connected to said diode connection point of said first and second diodes, and to a connection point between said third diode and said second semiconductor switch.

17. The converter of claim 15, further comprising a control IC for controlling said first and second semiconductor switches, said control IC comprising:

a high side well powered by said input supply voltage and including a first driver circuit connected for driving said first semiconductor switch;

a floating well powered by said flying capacitor and including a second driver circuit connected for driving said second semiconductor switch; and

a control circuit powered by an output voltage across said output circuit.

18. The converter of claim 17, wherein, at a start-up time, said control circuit charges said load capacitance to a predetermined initial voltage.

19. The converter of claim 18, wherein said control circuit controls said first semiconductor switch to charge said flying capacitance and thereby charge said load capacitance to said predetermined initial voltage.

20. The converter of claim 17, wherein said control circuit delivers a variable amount of charge to said load capacitance per unit time.

21. The converter of claim 20, wherein said control circuit increases a discharge frequency in response to an increase in load power demand, and maintains a predetermined fixed discharge time.

22. The converter of claim 21, wherein, when said discharge frequency reaches a predetermined maximum, the control circuit maintains said maximum frequency and increases the discharge time in response to an increase in load power demand.

23. The converter of claim 20, wherein, when said discharge frequency reaches a predetermined maximum, the control circuit maintains said maximum frequency and increases the discharge time in response to an increase in load power demand.

24. The converter of claim 20, wherein said first semiconductor switch is comprised in said first driver.

25. The converter of claim 24, wherein said first semiconductor switch includes a PMOS.

26. The converter of claim 25, wherein said second semiconductor switch includes an n-channel MOSFET.

27. The converter of claim 24, wherein said second semiconductor switch includes an n-channel MOSFET.

28. The converter of claim 15, wherein said first and second semiconductor switches are p-channel and n-channel devices, respectively.

29. A control IC for controlling first and second semiconductor switches in a switched-capacitor converter comprising:

a supply voltage input for receiving a supply voltage;

an output circuit comprising a load resistance and a load capacitance connected in parallel;

a diode circuit comprising a first diode and a second diode connected in series at a diode junction point, said diode circuit being connected in parallel with said output circuit;

first and second semiconductor switches connected in series at a switch junction point; said semiconductor switches being connected between said supply voltage input and said output circuit; and

a flying capacitance connected across said second semiconductor switch and to said diode junction point;

wherein said load capacitance is charged via said flying capacitance and said second diode when said first switch is ON and said second switch is OFF, and

said load capacitance is discharged via said first diode and said flying capacitance when said first switch is OFF and said second switch is ON;

said control IC comprising:

a high side well powered by said input supply voltage and including a first driver circuit connected for driving said first semiconductor switch;

a floating well powered by said flying capacitor and including a second driver circuit connected for driving said second semiconductor switch; and

a control circuit powered by an output voltage across said output circuit.

30. The control IC of claim 29, wherein, at a start-up time, said control circuit charges said load capacitance to a predetermined initial voltage.

31. The control IC of claim 30, wherein said control circuit controls said first semiconductor switch to charge said flying capacitance and thereby charge said load capacitance to said predetermined initial voltage.

32. The control IC of claim 29, wherein said control circuit delivers a variable amount of charge to said load capacitance per unit time.

33. The control IC of claim 32, wherein said control circuit increases a discharge frequency in response to an increase in load power demand, and maintains a predetermined fixed discharge time.

34. The control IC of claim 33, wherein, when said discharge frequency reaches a predetermined maximum, the control circuit maintains said maximum frequency and increases the discharge time in response to an increase in load power demand.

35. The control IC of claim 32, wherein, when said discharge frequency reaches a predetermined maximum, the control circuit maintains said maximum frequency and increases the discharge time in response to an increase in load power demand.

36. The control IC of claim 29, wherein said first and second semiconductor switches are interconnected by a third diode, said flying capacitor being connected to said diode connection point of said first and second diodes, and to a connection point between said third diode and said second semiconductor switch.

37. The control IC of claim 29, wherein said first and second semiconductor switches are connected to each other directly.